



POL Products Guide

For Ground Vehicle and Equipment
Materiel Systems

January 2005

Approved for Public Release; distribution unlimited

POL PRODUCTS GUIDE

This Petroleum, Oil and Lubricants (POL) Products Guide is designed as a quick reference to assist materiel and combat developers, supply and maintenance personnel, and other field users in properly using petroleum and its related product commodities that are common to the military supply system. The guidance being provided covers essentially fuels, fuel additives, lubricants, and associated products (e.g., hydraulic fluids, antifreeze, etc.) that are required and used in Army (and DOD) ground vehicles, equipment, and materiel. It also includes referee fuels and reference oils.

Individual product guides sheets have been developed and formatted to provide the maximum amount of information needed for using these POL Products. Each guide sheet covers a generic product type and includes such information as the relevant military/federal specification, military symbol and NATO Code Number, available container size and National Stock Number (NSN), product applications, temperature range limitation, and general comments relative to product usage.

This POL Products Guide is not intended to replace any military/ federal specification or the vehicle/equipment LUBE Order (LO), but merely to provide a quick reference source. This document will be updated periodically to accommodate changes in specifications, NSNs, etc.

As an example, this Guide will generate the following types of information on a typical product such as OE/HDO-15/40.

- OE/HDO-15/40 is the military symbol for the SAE 15W-40 Grade under MIL-PRF-2104. (Lubricating Oil, Internal Combustion Engine, Combat/Tactical Service).
- OE/HDO-15/40 is interchanged within NATO under Code Number O-1236. It is packaged in three (3) different size containers each having separate National Stock Numbers (NSN).
- OE/HDO-15/40 is one of four (4) different grades under MIL-PRF-2104. This oil is used in engines, hydraulic systems, transmissions, power steering units, and can be used in gear box units. However, one should consult the vehicle/equipment Lube Order (LO) if there is a question.
- OE/HDO-15/40, when used in either engines or transmissions, is acceptable for use in ambient temperatures ranging from approximately 0°F to 120°F.

The regulations governing responsibility for development and updating documents of this nature are listed as follows:

- Army Regulation 70-12, Fuels and Lubricants Standardization Policy for Equipment Design, Operation, and Logistic Support, 1 May 1997.
- Army Regulation 715-13, Engineering Support for Items Supported by Defense Logistics Agency, 13 March 1986.
- AMC Regulation 750-11, Use of Lubricants, Fluids, and Associated Products, 15 June 1986.

Questions relative to this document and its use should be directed to the following:

U.S. Army TARDEC/RDECOM
6501 E. 11 Mile Road
ATTN: Mr. Luis Villahermosa
AMSRD-TAR-D (MS-110)
Fuels and Lubricants Technology Team
Warren, MI 48397-5000

Facsimile:

Commercial (586) 574-4244
DSN 786-4244

Email: POLhelp@tacom.army.mil

Any recommended change or additions to improve the overall utility of this POL Products Guide are welcome and will be appreciated.

POL PRODUCTS GUIDE

<u>PRODUCT TYPE</u>	<u>SPECIFICATION</u>	<u>PAGE</u>
Combat/Tactical Engine Oils	MIL-PRF-2104 (OE/HDO) (SAE J2359)* MIL-PRF-46167 (OEA-30)	6
Commercial Engine Oils (Non-tactical /Administrative)	SAE J2363 SAE J2362	7 8
Turbine Engines Oils	MIL-PRF-7808 (LGT) MIL-PRF-23699	9
Automotive Engine/Preservation Oils	MIL-PRF-21260 (PE)	10
Preservative Oils (Non-Automotive)	MIL-PRF-32033 (PL-S) MIL-PRF-3150 (PL-M) MIL-PRF-46002	11
Gear Lubricants	MIL-PRF-2105 (GO) (SAE J2360)*	12
Solid Film Lubricants	MIL-PRF-46010 MIL-PRF-46147 MIL-L-23398 MIL-PRF-81329	13
Weapon Lubricants	MIL-L-46000 (LSA) MIL-L-46150 (LSAT) MIL-PRF-63460 (CLP) MIL-PRF-85336	14
Tactical Hydraulic Fluids	MIL-PRF-46170 (FRH) MIL-PRF-6083 (OHT) MIL-H-53119 (NFH)	15
Biodegradable Hydraulic Fluid	MIL-PRF-32073 (BHF)	16
Machine Tool Hydraulic Fluid	A-A-59354	17
Automatic Transmission Fluid	GM 6297-M	18
Brake Fluid	MIL-PRF-46176 (BFS)	19
Tactical Greases	MIL-PRF-10924 (GAA) MIL-PRF-81322 (WTR)	20
General Greases	VV-G-632 VV-G-671 (GG2)	21

*Note: The SAE document will replace the military specification at a date to be determined.

POL PRODUCTS GUIDE (CONT')

<u>PRODUCT TYPE</u>	<u>SPECIFICATION</u>	<u>PAGE</u>
Antifreezes and Test Kit	A-A-52624 A-A-51461	22
Fuel Anti-Icing Additive	MIL-DTL-85470 (FSII)	23
Fuel Biocide/Stabilizer Additive	MIL-S-53021	24
Fuel Corrosion/Lubricity Improver	MIL-PRF-25017	25
Gasoline Fuels	ASTM D 4814 A-A-52530	26
Diesel and Turbine Fuels	A-A-52557 ASTM D 975 MIL-DTL-5624 MIL-DTL-83133 ASTM D 1655	27
Referee Fuels	MIL-DTL-5624 (JP-4/JP-5) MIL-DTL-46162 MIL-F-53080	28
B20, Biodiesel Fuel	A-A-59693	29
Reference Oils	MIL-PRF-2104	30
Degreasing Solvents	MIL-PRF-680	31
Cleaning Compound	MIL-PRF-372	32
Lubricating Oil for Precision Rolling Bearings	MIL-DTL-53131	33

COMBAT/TACTICAL ENGINE OILS						DESCRIPTION
MIL-PRF-2104 - Lubricating Oil, Internal Combustion Engine, Tactical Service						These engine oils are designed for use in all combat and tactical diesel engine powered ground vehicles and equipment and includes performance requirements for power shift transmissions. Products are used also in many hydraulic, power steering, and gear box applications as specified by the Lube Orders (LO's). These oils are NOT to be used in HMMWV automatic transmissions. The 10W grade (OE/HDO-10) under MIL-PRF-2104 is not recommended for use in high output 2cycle diesel engines. Oils under MIL-PRF-2104 meet the API CF, modified CF-2, and CI-4 performance criteria. In addition, selected C-4 (Allison) and VC-70 (Caterpillar) transmission tests are included.
MIL-PRF-46167 - Lubricating Oil, Internal Combustion Engine, Arctic						
Military Specification	Military Symbol (SAE Grade)	NATO Code	Size Container	NSN 9150-	Application (All Products)	Ambient Temperature Range Usage (See Comments)
MIL-PRF-2104 <						

COMMERCIAL ENGINE OILS						DESCRIPTION																																																																																																																																		
SAE J2363 - Commercial Lubricating Oil, Heavy-Duty Diesel Engine, Non-Tactical Vehicles						Oils under SAE J2363 are intended for use in the engines of non-tactical and administrative vehicles equipped with compression ignition engines. The SAE 15W-40 and 5W-40 grades meet API CI-4 performance criteria, while the SAE 30 and 40 grades meet API CF and CF-2 performance criteria and are recommended for 2-cycle diesel engines only.																																																																																																																																		
Military Specification	Military Designation (SAE Grade)	NATO Code	Size Container	NSN 9150-	Application (All Products)	Ambient Temperature Range Usage (See Comments)																																																																																																																																		
SAE J2363	CHDO-15W-40 (SAE 15W-40)	NONE	1-Qt 5-Gal 55-Gal	01-351-9019 01-422-8899♣ 01-352-2962 01-422-8750♣ 01-351-9018 01-422-8746♣	★ Engine Systems Only	<div>SAE J2363 - FOR COMPRESSION IGNITION ENGINE SYSTEMS ONLY</div> <table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th><-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th><-46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr><tr><td rowspan="4"></td><td colspan="18">CHDO-30 (NONE)</td></tr><tr><td colspan="18">CHDO-40 (NONE)</td></tr><tr><td colspan="18">CHDO-15/40 (NONE)</td></tr><tr><td colspan="18">CHDO-5/40 (NONE)</td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		CHDO-30 (NONE)																		CHDO-40 (NONE)																		CHDO-15/40 (NONE)																		CHDO-5/40 (NONE)																	
	EXPECTED TEMPERATURES																																																																																																																																							
	°F	<-50	-40	-30			-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																																			
	°C	<-46	-40	-34			-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																																			
		CHDO-30 (NONE)																																																																																																																																						
CHDO-40 (NONE)																																																																																																																																								
CHDO-15/40 (NONE)																																																																																																																																								
CHDO-5/40 (NONE)																																																																																																																																								
CHDO-30 (SAE 30)	NONE	1-Qt 5-Gal 55-Gal	01-351-9016 01-422-9250♣ 01-352-8090 01-422-9247♣ 01-351-9015 01-422-8997♣																																																																																																																																					
CHDO-40 (SAE 40)	NONE	55-Gal	01-352-8091 01-422-8901♣																																																																																																																																					
CHDO-5W-40 (SAE 5W-40)	NONE	1-Qt 5-Gal 55-Gal	01-524-9134 01-524-9149♣ 01-524-9131 01-524-9155♣ 01-524-9129 01-524-9121♣																																																																																																																																					
Comments: The temperature ranges recommended for usage of the various grade oils conform with requirements established for the majority of ground vehicles (non-combat). However, these oils are not recommended for non-engine applications such as transmissions, hydraulic systems, power steering, generator sets, etc. The oils are only recommended for use in the engines of wheeled vehicles. Non-engine applications that require the use of engine oil must use MIL-PRF-2104. The NSNs identified with a ♣ - are for lubricants manufactured with a minimum of 25% re-refined basestock.																																																																																																																																								

COMMERCIAL ENGINE OILS						DESCRIPTION																																																																																																																		
SAE J2362 - Lubricating Oil, Automotive Engine, Military Administrative Service						Oils under SAE J2362 are designed for use in all gasoline consuming spark ignition engines used in administrative type, commercial vehicles. The SAE grades 5W-20, 5W-30, and 10W-30 meet the API SM and ILSAC GF-4 performance criteria.																																																																																																																		
Military Specification	Military Designation (SAE Grade)	NATO Code	Size Container	NSN 9150-	Application (All Products)	Ambient Temperature Range Usage (See Comments)																																																																																																																		
SAE J2362	5W-30	NONE	1-Qt 55-Gal	01-320-3706 01-422-9253♣	★ Engine Systems Only	SAE J2362 – FOR GASOLINE ENGINE SYSTEMS ONLY <table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th><-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th>< -46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr><tr><td></td><td colspan="18">10W-30 (NONE)</td></tr><tr><td></td><td colspan="18">5W-30 (NONE)</td></tr><tr><td></td><td colspan="18">5W-20 (NONE)</td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		10W-30 (NONE)																			5W-30 (NONE)																			5W-20 (NONE)																	
	EXPECTED TEMPERATURES																																																																																																																							
	°F	<-50	-40	-30			-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																			
	°C	< -46	-40	-34			-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																			
	10W-30 (NONE)																																																																																																																							
	5W-30 (NONE)																																																																																																																							
	5W-20 (NONE)																																																																																																																							
	10W-30	NONE	1-Qt 5-Gal 55-Gal	01-227-8210 01-413-6897♣ 01-230-9749 01-413-6892♣ 01-230-9748 01-413-6990♣																																																																																																																				
	5W-20	NONE	1-Qt 5-Gal 55-Gal	01-524-9228 01-524-9207♣ 01-524-9239 01-524-9203♣ 01-524-9236 01-524-9202♣																																																																																																																				
Comments: The temperature ranges recommended for usage of the various grade oils conform with requirements established for the majority of ground vehicles (non-combat). However, these oils are not recommended for non-engine applications such as transmissions, hydraulic systems, power steering, generator sets, etc. The oils are only recommended for use in the engines of wheeled vehicles. Non-engine applications that require the use of engine oil must use MIL-PRF-2104. The NSNs identified with a - ♣ - are for lubricants manufactured with a minimum of 25% re-refined basestock.																																																																																																																								

TURBINE ENGINE OILS						DESCRIPTION																																																																																																																																					
MIL-PRF-23699 - Lubricating Oil, Aircraft Turbine Engine, Synthetic Base MIL-PRF-7808 - Lubricating Oil, Aircraft Turbine Engine, Synthetic Base						These oils are used as the engine lubricant for the Abrams series tank and other systems equipped with turbine engines. These oils are not for use in any ground engine systems powered by diesel or gasoline engines.																																																																																																																																					
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9150-	Application (All Products)	Ambient Temperature Range Usage																																																																																																																																					
MIL-PRF-23699	NONE	O-152	Class C/I 7.5-Oz 1-Qt 55-Gal	00-180-6266 00-985-7099 00-681-5999	★ Turbine Engines Only	FOR TURBINE ENGINE <table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th><-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th><-46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr><tr><td colspan="19">MIL-PRF-7808 (O-163) Grade 4</td></tr><tr><td colspan="19">MIL-PRF-23699 (O-156)</td></tr><tr><td colspan="19">MIL-PRF-7808 (O-148) Grade 3</td></tr><tr><td colspan="19"></td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49	MIL-PRF-7808 (O-163) Grade 4																			MIL-PRF-23699 (O-156)																			MIL-PRF-7808 (O-148) Grade 3																																					
		EXPECTED TEMPERATURES																																																																																																																																									
		°F	<-50	-40			-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																																					
°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																																									
MIL-PRF-7808 (O-163) Grade 4																																																																																																																																											
MIL-PRF-23699 (O-156)																																																																																																																																											
MIL-PRF-7808 (O-148) Grade 3																																																																																																																																											
O-154	Class HTS 7.5-Oz 1-QT 55-Gal	01-439-0764 01-439-0756 01-439-2070																																																																																																																																									
O-156	Class STD 7.5-Oz 1-Qt 55-Gal	01-476-1075 01-476-1074 01-476-1083																																																																																																																																									
MIL-PRF-7808	NONE	O-148	8-Oz 1-Qt 1-Gal 55-Gal	00-108-5359 00-782-2627 00-270-4057 00-782-2679																																																																																																																																							
		O-163	1-Qt 1-Gal 55-Gal	01-414-5926 01-414-5927 01-414-8141																																																																																																																																							

Comments: The temperature ranges recommended for usage of the turbine engine oils conform with requirements established by the Lube Orders (LO) for the M1/M1A1 series tank. Requirements for other ground equipment may vary from these recommendations. LO's must be consulted if there is a question as to the proper lubricant which should be used. Prolonged skin contact with either oil should be avoided since it may cause skin rash. Areas using these oils should be well ventilated. Do not intermix these oils with other gasoline or diesel engine oils since damage to internal components will occur.

THESE RECOMMENDATIONS DO NOT APPLY TO AIRCRAFT.

AUTOMOTIVE ENGINE/PRESERVATIVE OILS						DESCRIPTION																																																																																																																																					
MIL-PRF-21260 - Lubricating Oil, Internal Combustion Engine, Preservative and Break-In						These engine oils are designed for preservation, break-in, and use in all combat/tactical diesel powered ground vehicles and equipment systems. These oils are operational oils meeting MIL-PRF-2104G requirements in addition to corrosion and preservation requirements. These products can be used where MIL-PRF-2104G oils are specified until the first recommended oil change or 50 hrs of operation, whichever comes first. These oils meet the API CF, modified CF-2, and CG-4 performance criteria. PE-10 grade is not for use in high output 2-cycle diesel engines.																																																																																																																																					
Military Specification	Military Symbol (SAE Grade)	NATO Code	Size Container	NSN 9150-	Application (All Products)	Ambient Temperature Range Usage (See Comments)																																																																																																																																					
MIL-PRF-21260	PE-15/40 (SAE 15W-40)	NONE	55-Gal	01-293-272	★ Preservation and Storage Engines, Hydraulic, and Transmission Systems ★ Break-In of New and Rebuilt Engine and Powertrain Systems	FOR ENGINE SYSTEMS																																																																																																																																					
	PE-10 (SAE 10W)	C-640	5-Gal 55-Gal	00-111-3199 00-111-0208		<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th><-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th>< -46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr><tr><td colspan="19">PE-10 (C-640)</td></tr><tr><td colspan="19">PE-30 (C-642)</td></tr><tr><td colspan="19">PE-40 (NONE)</td></tr><tr><td colspan="19">PE-15/40 (NONE)</td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49	PE-10 (C-640)																			PE-30 (C-642)																			PE-40 (NONE)																			PE-15/40 (NONE)																		
	EXPECTED TEMPERATURES																																																																																																																																										
	°F	<-50	-40	-30		-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																																							
°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																																									
PE-10 (C-640)																																																																																																																																											
PE-30 (C-642)																																																																																																																																											
PE-40 (NONE)																																																																																																																																											
PE-15/40 (NONE)																																																																																																																																											
PE-30 (SAE 30)	C-642	1-Pt 1-Qt 5-Gal 55-Gal	00-111-0201 00-153-0207 00-111-0209 00-111-0210																																																																																																																																								
PE-40 (SAE 40)	NONE	5-Gal	01-293-2773			FOR TRANSMISSION AND HYDRAULIC SYSTEMS																																																																																																																																					
<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th><-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th>< -46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr><tr><td colspan="19">PE-15/40 (NONE)</td></tr><tr><td colspan="19">PE-10 (C-640)</td></tr></table>							EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49	PE-15/40 (NONE)																			PE-10 (C-640)																																																								
EXPECTED TEMPERATURES																																																																																																																																											
°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																																									
°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																																									
PE-15/40 (NONE)																																																																																																																																											
PE-10 (C-640)																																																																																																																																											
<p><u>Comments:</u> The temperature ranges recommended for usage of the various grade oils conform with requirements established by the Lube Orders (LO) for the majority of the combat and tactical ground systems. However, requirements for some equipment may vary from these recommendations and individual equipment LO's must be consulted if there is a question as to the proper grade of lubricant which should be used. These oils are also utilized for the preservation of vehicles/equipment fuel systems.</p>																																																																																																																																											

PRESERVATIVE OILS						DESCRIPTION																																																																																																																																																				
MIL-PRF-32033 - Lubricating Oil, General Purpose, Preservative (Water-Displacing, Low Temperature)						<p>MIL-PRF-32033 is a water-displacing, preservative lubricating oil for general purpose lubrication and protection against corrosion of certain small arms and whenever a general purpose, low temperature lubricating oil is required. MIL-PRF-32033 can be applied by dipping, brushing or spraying from gas-pressurized cans.</p> <p>MIL-PRF-3150 is a general purpose preservative oil for ferrous and non-ferrous metals. It is not intended for protection of internal combustion engines. MIL-PRF-3150 can be applied by dipping or brushing; it is too viscous for spraying.</p> <p>MIL-PRF-46002 is a volatile corrosion inhibited oil for use in the preservation of materiel in enclosed systems where the volatile components will provide protection above the fluid level. It can also be used as a contact preservative.</p> <p>None of these preservative oils are to be used for the preservati on of fuel tanks or engines.</p>																																																																																																																																																				
MIL-PRF-3150 - Lubricating Oil, Preservative, Medium																																																																																																																																																										
MIL-PRF-46002 - Preservative Oil, Contact and Volatile Corrosion-Inhibited																																																																																																																																																										
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9150-	Application	Ambient Temperature Range Usage																																																																																																																																																				
MIL-PRF-32033	PL-S	O-190	1/2-Oz 1-Oz 4-Oz 16-Oz 16-Oz 1-Qt 1-Gal 5-Gal 55-Gal	00-836-8641 00-261-8146 00-273-2389 00-458-0075 01-374-2021 00-231-6689 00-231-9045 00-231-9062 00-281-2060	(Aerosol) (Sprayer) ★ Preservation and Lubrication of Materiel	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th><-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th>< -46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr><tr><td rowspan="5"></td><td colspan="18">PL-S (O-190)</td></tr><tr><td colspan="18">PL-M (O-192)</td></tr><tr><td colspan="18">MIL-P-46002, Grade 1</td></tr><tr><td colspan="18">MIL-PRF-46002, Grade 2</td></tr><tr><td colspan="18"></td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		PL-S (O-190)																		PL-M (O-192)																		MIL-P-46002, Grade 1																		MIL-PRF-46002, Grade 2																																			
EXPECTED TEMPERATURES																																																																																																																																																										
°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																																																								
°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																																																								
	PL-S (O-190)																																																																																																																																																									
	PL-M (O-192)																																																																																																																																																									
	MIL-P-46002, Grade 1																																																																																																																																																									
	MIL-PRF-46002, Grade 2																																																																																																																																																									
MIL-PRF-3150	PL-M	O-192	4-Oz 1-Qt 5-Gal 55-Gal	00-271-8427 00-231-2361 00-231-2356 00-231-2357																																																																																																																																																						
MIL-PRF-46002	NONE	NONE	1-Qt 5-Gal 55-Gal	00-889-3523 00-985-7293 00-407-0973	★ Preservation of non-wetted Surfaces																																																																																																																																																					
<u>Comments:</u> MIL-PRF-32033 is a light preservative oil which is also water-displacing. It has been found to wash away with water, so must be reapplied. MIL-PRF-3150 is a medium weight preservative oil with much more stringent corrosion inhibiting requirements, so may be a superior preservative oil for many applications which can tolerate a more viscous oil.																																																																																																																																																										

GEAR LUBRICANTS						DESCRIPTION																																																																																																																		
MIL-PRF-2105 - Lubricating Oil, Gear, Multipurpose (SAE J2360)						These gear lubricants are for use in differentials and manual transmissions, heavy duty industrial type enclosed gear units, steering gears, and fluid lubricated universal joints of automotive ground equipment. These lubricants are not intended for use in automatic transmission or power steering systems. The oils under MIL-PRF-2105 meet the API GL-5 and MT -1 (class 7/8 manual transmission) performance criteria.																																																																																																																		
Military Specification	Military Symbol (SAE Grade)	NATO Code	Size Container	NSN 9150-	Application (All Products)	Ambient Temperature Range Usage (See Comments)																																																																																																																		
MIL-PRF-2105	GO-75 (SAE 75W)	O-186	1-Qt 1-Gal 5-Gal	01-035-5390 01-048-4593 01-035-5391	★ Axles ★ Differentials	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th><-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th>< -46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr><tr><td></td><td colspan="18">GO-85/140 (O-228)</td></tr><tr><td></td><td colspan="18">GO-80/90 (O-226)</td></tr><tr><td></td><td colspan="18">GO-75 (O-186)</td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		GO-85/140 (O-228)																			GO-80/90 (O-226)																			GO-75 (O-186)																	
	EXPECTED TEMPERATURES																																																																																																																							
	°F	<-50	-40	-30	-20		-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																				
	°C	< -46	-40	-34	-29		-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																				
	GO-85/140 (O-228)																																																																																																																							
	GO-80/90 (O-226)																																																																																																																							
	GO-75 (O-186)																																																																																																																							
	GO-80/90 (SAE 80W-90)	O-226	1-Qt 5-Gal 55-Gal	01-035-5392 01-422-9329♣ 01-035-5393 01-422-9335♣ 01-035-5394 01-422-9340♣	★ Final Drives ★ Heavy Duty Industrial type Enclosed Gear Units																																																																																																																			
	GO-85/140 (SAE 85W-140)	O-228	1-Qt 5-Gal 55-Gal	01-048-4591 01-035-5395 01-035-5396	★ Manual Transmission																																																																																																																			
	GO-80/90 (SAE 80W-90) LIMITED SLIP	O-226	5-Gal	00-001-9395 01-422-9342♣	★ Steering Gears ★ Wire Rope ★ Fluid Lubricated Universal Joints																																																																																																																			

Comments: The temperature ranges recommended for usage of the various oils conform with requirements established by the Lube Orders (LO) for the majority of the combat and tactical ground systems. However, requirements for some equipment may vary from these recommendations and individual LO's must be consulted if there is a question as to the proper grade of lubricant which should be used. Limited-slip differentials allow unequal torque to be transmitted to each axle and require the use of special friction modified gear lubricants. For these applications those gear lubricants designated "GO-80/90 LIMITED SLIP" are required. The friction-modified oils can be used in standard (non limited-slip) differentials, without any adverse effect. The NSNs identified with a ♣ are for gear lubricants manufactured with a minimum of 25% re-refined basestock.

SOLID FILM LUBRICANTS						DESCRIPTION																																																																																																																																																																																														
MIL-PRF-46010 - Lubricant, Solid Film, Heat Cured, Corrosion Inhibiting						MIL-PRF-46010 is dispersion of lubricating solids suspended in an adhesive binder that upon application and heat curing provides a solid lubricating surface. MIL-PRF-46147 is a dispersion of lubricating solids suspended in an adhesive binder that can be applied to a surface and allowed to dry at room temperature to form the solid lubricating surface. MIL-L-23398 is similar to MIL-PRF-46147 except it provides corrosion protection against exposure to sulfurous acid, but does not have the same wear properties.																																																																																																																																																																																														
MIL-PRF-46147 - Lubricant, Solid Film, Air-Cured, Corrosion Inhibiting																																																																																																																																																																																																				
MIL-L-23398 - Lubricant, Solid Film, Air-Cured, Corrosion Inhibiting, NATO Code Number S-749																																																																																																																																																																																																				
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9150-	Application (All Products)	Ambient Temperature Range Usage																																																																																																																																																																																														
MIL-PRF-46010 Type III	NONE		1-Gal 1-Gal	01-416-9506 (Natural) 01-416-9509 (Black)	★ Special Uses	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><td><-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><th>°C</th><td>< -46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td></td><td colspan="18">MIL-PRF-46010</td></tr><tr><td></td><td colspan="18"></td></tr><tr><td></td><td colspan="18">MIL-PRF-46147</td></tr><tr><td></td><td colspan="18"></td></tr><tr><td></td><td colspan="18">MIL-L-23398 (S-749)</td></tr><tr><td></td><td colspan="18"></td></tr><tr><td></td><td colspan="18"></td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		MIL-PRF-46010																																						MIL-PRF-46147																																						MIL-L-23398 (S-749)																																																							
EXPECTED TEMPERATURES																																																																																																																																																																																																				
°F	<-50	-40	-30	-20	-10		0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																																																																																																	
°C	< -46	-40	-34	-29	-23		-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																																																																																																	
	MIL-PRF-46010																																																																																																																																																																																																			
	MIL-PRF-46147																																																																																																																																																																																																			
	MIL-L-23398 (S-749)																																																																																																																																																																																																			
MIL-PRF-46147 Type 1-Can	NONE		1-Qt 1Gal 1-Qt 1-Gal	01-360-1908 01-360-1909 01-360-1907 00-142-9361	Form 1-Color 2 Form 1-Color 2 Form 1-Color 1 Form 1-Color 1																																																																																																																																																																																															
Type 1-Aerosol			12 Oz. 16 Oz. 12 Oz. 16 Oz.	01-360-1904 01-360-1906 01-360-1903 01-360-1905	Form 2-Color 2 Form 2-Color 2 Form 2-Color 1 Form 2 Color 1																																																																																																																																																																																															
Type II	NONE			01-500-2751 01-500-2795 01-500-2801 01-500-3017 01-500-3099 01-500-3104 01-500-3108 01-500-3114																																																																																																																																																																																																
	NONE																																																																																																																																																																																																			
MIL-L-23398		S-749	16 Oz. 1 Qt.	01-260-2534 00-954-7422	(Aerosol)																																																																																																																																																																																															
Comments: MIL-PRF-46010, Type III provides both high load carrying capacity and long wear life and also both types of corrosion protection. Type III is low in volatile organic compound content and lead free and is intended to replace Types I and II whenever possible. MIL-PRF-46147 has two types. Type I, available in bulk and in aerosol cans, is solvent based. Type II, available in bulk form only, has a lower endurance life than Type I. The aerosol form provides in-field use capability. Both MIL-PRF-46010 and MIL-PRF-46147 are available in black and natural colors. MIL-L-23398 is similar to MIL-PRF-46147 except for performance differences noted in the Description section above.																																																																																																																																																																																																				

WEAPON LUBRICANTS						DESCRIPTION																																																																																																																																																																						
MIL-PRF-14107 - Lubricating Oil, Weapons, Low Temperature						MIL-PRF-14107 is a low temperature preservative and lubricating oil for aircraft and small caliber ground weapons. MIL-L-46000* is a semi-fluid lubricant for automatic weapons under conditions of extreme pressure for use in all temperatures. MIL-L-46150 is a semi-fluid lubricant, containing "Teflon", for the 7.62 mm machine gun and for other applications requiring an extreme pressure (high load) lubricant with a low coefficient of friction. MIL-PRF-63460 is a cleaner, lubricant and short term preservative for both small and large caliber weapons for use in a field environment where ease of application and convenience of a single product are important. It is usable in all climatic conditions. MIL-PRF-85336 is a petroleum and/or synthetic corrosion inhibited semi-fluid intended for lubrication of aircraft weapons.																																																																																																																																																																						
MIL-L-46000 * - Lubricant, Semi-Fluid (Automatic Weapons)																																																																																																																																																																												
MIL-L-46150 - Lubricant, Weapons, Semi-Fluid (High Load Carrying Capacity)																																																																																																																																																																												
MIL-PRF-63460 - Lubricant, Cleaner and Preservative for Weapons and Weapons Systems (Metric)																																																																																																																																																																												
MIL-PRF-85336 - Lubricant, All Weather (Automatic Weapons)																																																																																																																																																																												
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9150-	Application (All Products)	Ambient Temperature Range Usage																																																																																																																																																																						
MIL-PRF-14107	LAW	O-157	1-Qt 5-Gal	00-292-9689 00-292-9687	* Small caliber Weapons	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th><-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th>< -46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr><tr><td rowspan="6"></td><td colspan="18">LAW (O-157)</td></tr><tr><td colspan="18">LSA (O-158)</td></tr><tr><td colspan="18">LSAT</td></tr><tr><td colspan="18">CLP (S-758)</td></tr><tr><td colspan="18">MIL-PRF-85336</td></tr><tr><td colspan="18"></td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		LAW (O-157)																		LSA (O-158)																		LSAT																		CLP (S-758)																		MIL-PRF-85336																																			
EXPECTED TEMPERATURES																																																																																																																																																																												
°F	<-50	-40	-30	-20	-10		0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																																																																									
°C	< -46	-40	-34	-29	-23		-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																																																																									
	LAW (O-157)																																																																																																																																																																											
	LSA (O-158)																																																																																																																																																																											
	LSAT																																																																																																																																																																											
	CLP (S-758)																																																																																																																																																																											
	MIL-PRF-85336																																																																																																																																																																											
MIL-L-46000	LSA	O-158	2-Oz 4-Oz 1-Qt 1-Gal	00-935-6597 00-889-3522 00-687-4241 00-753-4686	★ Large caliber Weapons																																																																																																																																																																							
MIL-L-46150	LSAT-T	NONE	8-Oz 1-Lb	00-949-0323 01-109-7793	★ Small caliber Weapons																																																																																																																																																																							
MIL-PRF-63460	CLP	S-758	1/2-Oz 4-Oz 1-Pt 1-Lt 1-Gal	01-102-1473 01-079-6124 01-054-6453 01-327-9631 01-053-6688	★ Small and Large Automatic Weapons																																																																																																																																																																							
MIL-PRF-85336	NONE	NONE	1-Qt	01-104-5227	* See Comments																																																																																																																																																																							
<u>Comments:</u> MIL-PRF-63460 may be used instead of MIL-PRF-372 (Rifle Bore Cleaner), MIL-PRF-32033 (Low Temperature Preservative Lubricating Oil), and MIL-PRF-3150 (Medium Preservative Lubricating Oil). MIL-PRF-14107, MIL-L-46000 and MIL-L-46150 may be used for specific applications where tests have shown it to be satisfactory for large and small caliber weapons. MIL-PRF-85336 is intended for use on 20 mm rotary guns on almost all parts. It reduces corrosion in marine environments, permits high firing rates at low temperatures, and permits operation under icing conditions. * Specification is Inactive for New Design.																																																																																																																																																																												

TACTICAL HYDRAULIC FLUIDS						DESCRIPTION																																																																																																																		
MIL-PRF-46170 - Hydraulic Fluid, Rust Inhibited, Fire Resistant, Synthetic Hydrocarbon Base						MIL-PRF-46170 is a synthetic hydrocarbon base hydraulic fluid. Type I is undyed and is intended for tank recoil and hydraulic systems. MIL-PRF-6083 is a petroleum based hydraulic fluid for use as a recoil and hydraulic fluid in howitzers and certain other equipment where MIL-PRF-46170 is not used. MIL-H-53119 is a chlorotrifluoroethylene (CTFE) based hydraulic fluid which is nonflammable to all known flammability hazards. It is to be used only in hydraulic systems which are specifically designed for its use. All fluids meet stringent particle cleanliness standards. MIL-PRF-6083 and MIL-PRF-46170 are rust inhibited and are used both as preservatives for hydraulic systems and components as well as being operational fluids.																																																																																																																		
MIL-PRF-6083 - Hydraulic Fluid, Petroleum Base for Preservation and Operation																																																																																																																								
MIL-H-53119 - Hydraulic Fluid, Nonflammable, Chlorotrifluoroethylene Base																																																																																																																								
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9150-	Application	Ambient Temperature Range Usage																																																																																																																		
MIL-PRF-46170 Type I (yellow)	FRH	H-544	1-Pt 1-Qt 1-Gal 5-Gal 55-Gal	01-332-7819 00-111-6256 00-111-6254 00-111-6255 01-158-0462	★ Hydraulic Systems ★ Gun Recoil Systems ★ Tank Suspension Systems	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><td><-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><th>°C</th><td>< -46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td></td><td colspan="18">OHT (C-635)</td></tr><tr><td></td><td colspan="18">FRH (H-544)</td></tr><tr><td></td><td colspan="18">NFH</td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		OHT (C-635)																			FRH (H-544)																			NFH																	
EXPECTED TEMPERATURES																																																																																																																								
°F	<-50	-40	-30	-20	-10		0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																					
°C	< -46	-40	-34	-29	-23		-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																					
	OHT (C-635)																																																																																																																							
	FRH (H-544)																																																																																																																							
	NFH																																																																																																																							
MIL-PRF-6083	OHT	C-635	Aerosol 1-Qt 1-Gal 5-Gal 55-Gal	00-159-4472 00-935-9807 00-935-9808 00-935-9809 00-935-9810																																																																																																																				
MIL-H-53119*	NFH	NONE	none at this time	none at this time	★ ASM Vehicles																																																																																																																			
<u>Comments:</u> MIL-PRF-6083 and MIL-PRF-46170 may be used as emergency substitutes for each other. MIL-PRF-5606 (OHA, H-515) is the non-corrosion inhibited version of MIL-PRF-6083 and is not authorized for Army ground equipment. MIL-PRF-83282 (H-537) is the non-corrosion inhibited version of MIL-PRF-46170 and is not authorized for use in Army ground equipment. However, MIL-PRF-5606 and MIL-PRF-83282 may be used as emergency substitutes for MIL-PRF-6083 and MIL-PRF-46170. MIL-H-53119 is not compatible with either MIL-PRF-6083, MIL-PRF-46170, MIL-PRF-5606, MIL-PRF-83282, MIL-PRF-87257 and cannot be used as an emergency substitute for those fluids. MIL-PRF-6083 has a flash point of at least 82°C, MIL-PRF-46170 has a flash point of at least 218°C, and MIL-H-53119 has no flash point (is nonflammable).																																																																																																																								
* Inactive for New Design.																																																																																																																								

AUTOMATIC TRANSMISSION FLUID						DESCRIPTION																																																																																														
DEXRON III, Automatic Transmission Fluid						DEXRON III is intended for use in automatic transmissions in GM and AMC manufactured administrative and some tactical vehicles. The transmission of these vehicles requires fluids with special frictional characteristics.																																																																																														
Specification	Military Symbol	NATO Code	Size Container	NSN	Application (All Products)	Ambient Temperature Range Usage																																																																																														
DEXRON III	NONE	NONE	1 Qt 5 Gal 1 Qt HDPE 55 Gal	9150-00-698-2382 9150-00-657-4959 9150-01-353-4799 9150-01-114-9968	Automatic Transmissions	<div>FOR GM AND AMC AUTOMATIC TRANSMISSIONS</div> <table><tr><td colspan="19">EXPECTED TEMPERATURES</td></tr><tr><td>°F</td><td><-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><td>°C</td><td>< -46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td rowspan="2"></td><td colspan="18">(DEXRON III)</td></tr><tr><td colspan="18"><div></div></td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		(DEXRON III)																		<div></div>																	
EXPECTED TEMPERATURES																																																																																																				
°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																		
°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																		
	(DEXRON III)																																																																																																			
	<div></div>																																																																																																			
<u>Comments:</u> This fluid shall only be used in tactical vehicles when explicitly required by the Military Lubrication Orders (LO). However, it is not intended for Arctic conditions where temperatures go below -40°F. Use lubricants under MIL-PRF-46167 for Arctic conditions.																																																																																																				

BRAKE FLUID						DESCRIPTION																		
MIL-PRF-46176 - Brake Fluid, Silicone, Automotive, All Weather, Operational and Preservative, Metric						MIL-PRF-46176 is a silicone brake fluid classified as DOT 5 which is resistant to water and prevents corrosion. It also meets SAE J1705 (Low Water Tolerant Brake Fluids).																		
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9150-	Application	Ambient Temperature Range Usage																		
MIL-PRF-46176	BFS	H-547	1-Gal 5-Gal 55-Gal	01-102-9455 01-123-3152 01-072-8379	★ Brake Systems	EXPECTED TEMPERATURES																		
						°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
						°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
						BFS (H-547)																		
<u>Comments:</u> MIL-PRF-46176 is a corrosion inhibiting brake fluid that has a higher vapor lock temperature than conventional SAE 1703 or DOT 3 brake fluids (i.e., glycol ether base brake fluid). It can be used in arctic environments and also functions as a preservative fluid in storage/prepositioning applications. MIL-PRF-46176 is not compatible with conventional DOT 3 and DOT 4 brake fluids. DOT 5 is a silicone brake fluid similar to MIL-PRF-46176, but has slightly different viscosity properties.																								

TACTICAL GREASES						DESCRIPTION																																																																																																																		
MIL-PRF-10924 - Grease, Automotive and Artillery MIL-PRF-81322 - Grease, Aircraft, General Purpose, Wide Temperature Range						MIL-PRF-10924 covers one grade of a multi-purpose grease for lubrication and surface corrosion protection of all ground vehicles and equipment. MIL-PRF-81322 covers a general purpose grease for use in aircraft accessories. These greases are not intended for use on machinery which comes in contact with food.																																																																																																																		
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9150-	Application	Ambient Temperature Range Usage																																																																																																																		
MIL-PRF-10924	GAA	G-403	2-1/4 oz 14-oz 1.75-lb 6.5-lb 35-lb 120-lb 370-Lb	01-197-7688 01-197-7693 01-197-7690 01-197-7689 01-197-7692 01-197-7691 01-501-7745	<p>★ Automotive Wheel Bearing and Chassis System</p> <p>★ Artillery</p> <p>★ Ground Equipment</p> <p>★ General Application</p>	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><td>°F</td><td><-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><td>°C</td><td>< -46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td></td><td colspan="18">GAA (G-403)</td></tr><tr><td></td><td colspan="18">WTR (G-395)</td></tr><tr><td></td><td colspan="18"></td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		GAA (G-403)																			WTR (G-395)																																				
EXPECTED TEMPERATURES																																																																																																																								
°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																						
°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																						
	GAA (G-403)																																																																																																																							
	WTR (G-395)																																																																																																																							
MIL-PRF-81322	WTR	G-395	8-oz 1-lb 5-lb 35-lb	00-181-7724 00-944-8953 00-145-0268 00-935-5851	<p>★ Aircraft Wheel Bearings</p> <p>★ Anti-friction Bearings</p> <p>★ Gear Box</p> <p>★ Plain Bearings</p>																																																																																																																			
<u>Comments:</u> MIL-PRF-10924 is lithium complex grease and is designed for use over a wide operating temperature and in a saltwater corrosion environment. Most of MIL-PRF-81322 greases are clay-thickened greases and they may not be fully compatible with MIL-PRF-10924 greases. Both greases can be used where bearing temperatures range from -54°C to 180°C.																																																																																																																								

GENERAL GREASES						DESCRIPTION																																																																																															
VV-G-632 - Grease, Industrial, General Purpose VV-G-671 - Grease, Graphite						VV-G-632 and VV-G-671 each cover one grade of a lubricating grease intended primarily for the lubrication of machinery which is equipped with compression type grease cups. VV-G-671 covers graphite grease and provides a higher load-carrying capacity than VV-G-632 grease.																																																																																															
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9150-	Application	Ambient Temperature Range Usage																																																																																															
VV-G-632	NONE	NONE	8-oz 35-lb	00-753-4649 00-273-2374	★ General Equipment and Machinery	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><td>°F</td><td><-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><td>°C</td><td>< -46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td></td><td colspan="18">VV-G-632 (NONE)</td></tr><tr><td></td><td colspan="18">VV-G-671 (G-412)</td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		VV-G-632 (NONE)																			VV-G-671 (G-412)																	
EXPECTED TEMPERATURES																																																																																																					
°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																			
°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																			
	VV-G-632 (NONE)																																																																																																				
	VV-G-671 (G-412)																																																																																																				
VV-G-671	GG2	G-412	1.75-lb 6.5-lb	00-190-0918 00-190-0919	★ General Equipment and Machinery requiring a Graphite Grease																																																																																																
<u>Comments:</u> Neither of these greases are inhibited against oxidation or corrosion under adverse conditions. Caution is advised in using these greases in non-specified applications. Particularly, the use of graphite grease in non-specified applications should be done only after evaluating its compatibility with all involved materials. Consult Lube Order (LO) for specific guidance. VV-G-671 contains 4.5 to 5.5% graphite.																																																																																																					

ANTIFREEZE AND TEST KIT						DESCRIPTION																																																																																																																																																																																														
A-A-52624 Antifreeze, Multi Engine Type						A-A-52624 covers a fully formulated commercial antifreeze for use in tactical/combat liquid-cooled internal Combustion engines other than aircraft. It covers two types and each type can have up to three concentrations as follows: Type I: Ethylene Glycol Based; Type II: Propylene Glycol Based. Concentration A: 100% Glycol by volume; Concentration B: 60% Glycol by volume: Concentration C: 50% Glycol by volume. The concentrated versions (Type 1A or Type IIA) must be blended prior to using in radiator. A-A-51461 Type II covers a test strip kit for determining both the freeze point and nitrite concentration of																																																																																																																																																																																														
A-A-51461 Test Kit, Test Strips and Color Chart , Antifreeze, Freeze Point and Nitrite Concentration Type I Type II																																																																																																																																																																																																				
Military Specification	Military Symbol	NATO Code	Size Container	NSN 6850-	Application	Ambient Temperature Range Usage																																																																																																																																																																																														
A-A-52624 (Virgin) Type 1A	NONE	S-750	1-Gal 5-Gal 1-QT	01-441-3218 01-441-3221 00-664-1399	Multi Engines	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th><-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th>< -46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr><tr><td colspan="19">60/40 A-A-52624 (Type I & II-B)</td></tr><tr><td colspan="19">A-A-52624 Type (I & II - C)</td></tr><tr><td colspan="19">A-A-51461</td></tr><tr><td colspan="19"> </td></tr><tr><td colspan="19"> </td></tr><tr><td colspan="19"> </td></tr><tr><td colspan="19"> </td></tr></table> <p>* A mixture of 60% A-A-52642 Types I and II and 40% water will provide freeze protection down to approximately -55°F (-48°C).</p>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49	60/40 A-A-52624 (Type I & II-B)																			A-A-52624 Type (I & II - C)																			A-A-51461																																																																																														
EXPECTED TEMPERATURES																																																																																																																																																																																																				
°F	<-50	-40	-30	-20	-10		0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																																																																																																	
°C	< -46	-40	-34	-29	-23		-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																																																																																																	
60/40 A-A-52624 (Type I & II-B)																																																																																																																																																																																																				
A-A-52624 Type (I & II - C)																																																																																																																																																																																																				
A-A-51461																																																																																																																																																																																																				
(Virgin) Type IIA			1-Gal 5 Gal CO 55 Gal DR Box/6, 1Gal	01-383-4068 01-441-3257 01-383-3918 01-383-4244	Multi Engines																																																																																																																																																																																															
(Virgin) Type 1B			1 Gal 5 Gal CO 55 Gal DR	01-441-3234 01-441-3240 01-441-3248	Artic condition																																																																																																																																																																																															
(Recycled) Type I	NONE	NONE	1-Gal 5-Gal 55 Gal	01-464-9125 01-464-9137 01-464-9152	Multi Engines																																																																																																																																																																																															
A-A-52624 Recycled Type IB	NONE		1-Gal 5-Gal 55-Gal	01-464-9266 01-464-9263 01-464-9096	Artic condition																																																																																																																																																																																															
Recycled Type IIA	NONE		1Gal 5-Gal 55-Gal	01-464-9131 01-464-9107 01-464-9124	Multi Engines																																																																																																																																																																																															
Recycled Type IC	NONE		1-Gal 5-al 55-Gal DR	01-471-6530 01-471-6534 01-471-6521	Multi Engines																																																																																																																																																																																															
A-A-51461	NONE	NONE	Kit	Type II (See comment)	A-A-52624 coolants																																																																																																																																																																																															
<u>Comments:</u> Use commercial test strips that test for freeze point and nitrite concentration for both ethylene glycol and propylene glycol based coolants.																																																																																																																																																																																																				

FUEL ANTI-ICING ADDITIVE						DESCRIPTION																																																																																															
MIL-DTL-85470, Inhibitor, Icing, Fuel System, High Flash						This product is used primarily used in turbine fuels to cope with small amounts of water contamination (entrained water), or to keep separated water from freezing. Military turbine fuels (JP-4, JP-5 and JP-8) are procured with the Fuels System Icing Inhibitor (FSII) already in the fuel. Additional FSII is not added to these fuels except under special circumstances (e.g., removal of the original FSII by water contact). FSII can also be added to commercial turbine fuels (ASTM D 1655) which do not already contain it in order for these fuels to be brought up to military standards if so authorized. FSII can also be used in diesel fuels (A-A-52557, ASTM D 975) to meet low temperature needs. FSII has no effect on the diesel fuel cloud point (wax formation tendency).																																																																																															
Military Specification	Military Symbol	NATO Code	Size Container	NSN	Application (All Products)	Ambient Temperature Range Usage																																																																																															
MIL-DTL-85470	FSII	S-1745	5 Gal 55 Gal	6850-01-057-6427 6850-01-089-5514	✓ Bulk and Intermediate Fuel Tanks ✓ Fuel Transport Vehicles and Fuel Cells	<div>FOR FUEL STORAGE AND VEHICLE FUEL SYSTEMS</div> <table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><td>°F</td><td><-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><td>°C</td><td>< -46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td></td><td colspan="18">FSII (S-1745)</td></tr><tr><td></td><td colspan="18"></td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		FSII (S-1745)																																				
EXPECTED TEMPERATURES																																																																																																					
°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																			
°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																			
	FSII (S-1745)																																																																																																				
<p><u>Addition instructions:</u> FSII should only be added to turbine fuels by direction of the Petroleum Officer. To determine the level of FSII in turbine fuels, use ASTM D 5006.. Prescribed levels of FSII for turbine fuels are as follows: JP-4, 0.10 to 0.15 vol % ; JP-5, 0.15 to 0.20 vol % ; JP-8, 0.10 to 0.15 vol %. Addition of FSII to turbine fuels can be accomplished through the use of special injection equipment available at selected Air Force bases; otherwise use batch addition and mixing. Recommended level of FSII to diesel fuel (A-A-52557, ASTM D 975) is 0.15 vol %. Addition can be accomplished batch-wise by adding FSII on top of the fuel in a storage tank or tank truck; mixing can be accomplished by recirculating the fuel for at least 5 minutes for each 1000 gallons at a rate of at least 50 gallons per minute.</p> <p><i>Diethylene glycol monomethyl ether (DIEGME) is hazardous to health. Before handling DIEGME, proper safety precautions should be followed. Avoid contact with skin and eyes by wearing protective gloves and goggles. Read the instructions on the container and the Materials Safety Data Sheet (MSDS) before handling the additive. Use the recommended protective equipment. In case of leaks or spills, follow the instructions in the MSDS for disposal.</i></p>																																																																																																					

FUEL BIOCIDES/STABILIZER ADDITIVE						DESCRIPTION																				
MIL-S-53021 - Stabilizer Additive, Diesel Fuel						MIL-S-53021 is for use in diesel fuel (A-A-52557, ASTM D 975) intended for intermediate (6-24 months) or long term (25-60 months) storage. This additive is designed to retard or prevent the formation of fuel deterioration products (i.e., gums, sludge, particulates, etc.) resulting from auto-oxidation, to reduce the potential for microbiological growth, and to provide for corrosion protection of fuel-wetted surfaces. This additive is for the treatment of fuel in (1) depot facilities where vehicles/equipment are in re-build or storage, (2) pre-positioned materiel at locations involving storage of equipment partially or fully fueled, and (3) fuel stocks intended for intermediate or long-term storage. Fuels treated with this additive shall not be used in aircraft.																				
Military Specification	Military Symbol	NATO Code	Size Container	NSN	Application	Ambient Temperature Range Usage																				
MIL-S-53021						FOR FUEL STORAGE AND VEHICLE FUEL SYSTEMS																				
Type I	NONE	NONE	5 Gal 55 Gal	6850-01-246-6544 6850-01-246-6545	★ Bulk and Intermediate Fuel Storage Tanks	EXPECTED TEMPERATURES																				
						°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120		
						°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		
Type II: Biocide Stabilizer	NONE	NONE	5 Gal (Use both NSNs)	6840-01-173-6940 6850-01-167-4789	★ Fuel Transport Vehicles and Fuel Cells	MIL-S-53021																				
Biocide Stabilizer			55 Gal (Use both NSNs)	6840-01-041-0098 6850-01-167-4788																						
<p><u>Comments:</u> There are two types of stabilizer additives that have been qualified: the one package (Type I) and two package (Type II) systems. In the two-package type (i.e., Type II), the biocide is in one package or container, and the remaining additives are in the other. In most cases, both packages in Type II must be ordered and used together for maximum effectiveness. The one-package type (i.e., Type I) stabilizer additive has all of the additives, including the biocide, blended together in one container. The additives are supplied under several different brand names as listed in QPL-53021. The recommended treat rate varies with brand name and is specified in the QPL.</p> <p><u>Mixing tips:</u> When possible, bulk fuel supplies should be treated prior to dispensing the fuel, rather than treating fuel in individual vehicle fuel tanks. Additive(s) should not be added to an empty fuel tank and should be kept away from water. Most effective addition of the additive is to add to a partially filled tank as the additional fuel subsequently being introduced will provide agitation. Addition in a flowing stream is also effective. After fuel in a vehicle is treated, fuel filters may need to be changed due to the accumulation of dead microbiological debris.</p> <p><i>Observe proper safety precautions when handling additives. Handle the product in open areas with good ventilation and avoid excessive inhalation of vapors. During hot weather, which increases the vapor hazard, or if handling the additives in enclosed areas, use hydrocarbon vapor-absorbing respiratory protection. Avoid contact with skin and eyes by wearing protective gloves and goggles. Read the instructions on the container and the Materials Safety Data Sheet (MSDS) before handling the additives. Use the recommended protective equipment. In case of leaks or spills, follow the instructions in the MSDS for disposal.</i></p>																										

GROUND FUEL LUBRICITY ENHANCEMENT USING CORROSION INHIBITOR/LUBRICITY IMPROVER						DESCRIPTION																																																																												
MIL-PRF-25017 - Inhibitor, Corrosion/Lubricity Improver, Fuel Soluble (Metric)						The MIL-PRF-25017 Corrosion Inhibitor/Lubricity Improver (CI/LI) is primarily an aircraft fuel additive mandated for use in all military aircraft turbine fuels (JP-4, JP-5, JP-8). It is supplied under several different brand names as listed in QPL-25017. The recommended dosage varies with brand name. It usually is not added at depot or by using units but is supplied in the fuel by refiners. The additive can be added to ground fuels to enhance lubricity. The QPL places brands in two categories: category 1 for ground and aircraft fuels and category 2 for aircraft fuels only. It has been determined that at the recommended dosage it is an effective fuel lubricity enhancer.																																																																												
Military Specification	Military Symbol	NATO Code	Size Container	NSN 6850-	Application	Ambient Temperature Range Usage																																																																												
MIL-PRF-25017	NONE	S-1747	1 Gal 55 Gal	01-180-1074 00-292-9780	★ Bulk and Intermediate Fuel Storage Tanks ★ Fuel Transport Vehicles	<div>FOR FUEL STORAGE AND VEHICLE FUEL SYSTEMS</div> <table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><td><-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><th>°C</th><td><-46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td></td><td colspan="18">MIL-PRF-25017</td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		MIL-PRF-25017																	
EXPECTED TEMPERATURES																																																																																		
°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																
°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																
	MIL-PRF-25017																																																																																	
<p><u>Additional instructions:</u> It is recommended that addition of additives be accomplished at the wholesale level. Addition to ground fuels is best accomplished with fuel injectors that can control dosage. Second best option is to add in tank vehicles or in above ground tanks. Premix the additive with a small quantity of fuel (about 0.5 % of the quantity of fuel to be treated) and add to the tank <i>before</i> the bulk fuel. Mixing is accomplished by recirculation within the tank. Mixing time can be estimated by using the following formula: mixing time (min.) = 1/2(fuel quantity)/(recirculating pump capacity). If premix must be poured over the top of the fuel, mixing time should be doubled. If recirculation is not possible, mixing may be achieved by movement of the tank. Tank vehicle should be driven at moderate speed over rough terrain for a minimum of fifteen minutes or on a highway for 30 minutes.</p> <p><i>In general, the MIL-PRF-25017 additive is considered mildly hazardous. The hazard varies with the formulation used, check with the Material Safety Data Sheet (MSDS) supplied with the additive. Avoid contact with skin and eyes by wearing protective gloves and goggles. In case of leaks or spills, follow the instructions in the MSDS for disposal. When recirculating fuel within a tank, be sure to ground the discharge nozzle to the tank body.</i></p>																																																																																		

GASOLINE FUELS						DESCRIPTION
ASTM D 4814 - Specification for Automotive Spark-Ignition Engine Fuel A-A-52530 - Gasohol, Automotive, Unleaded						These fuels are intended for ground combat, tactical and administrative vehicles and combat service support equipment as indicated in vehicle/equipment manuals. ASTM D 4814 (gasoline) for CONUS use, and NATO F-57 for OCONUS use, cover gasoline fuels suitable for use in spark-ignition (gasoline) engines and equipment designed to utilize gasoline. A-A-52530 is gasohol and contains 10% volume denatured ethanol in gasoline.
Specification	Military Symbol	NATO Code	Size Container	NSN 9130-	Application	Temperature Range Usage
ASTM D 4814 Special grade Regular grade Midrange grade Premium grade	--- --- --- ---	--- --- --- ---	Bulk Bulk Bulk Bulk	00-148-7102 00-148-7103 01-272-0983 00-148-7104	★ Ground Gasoline Engines and Gasoline Fueled Equipment	FOR FUEL STORAGE AND VEHICLE FUEL SYSTEMS
EXPECTED TEMPERATURES						
°F <-50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120						
°C <-46 -40 -34 -29 -23 -18 -12 -7 -1 4 10 16 21 27 32 38 44 49						
Gasoline, Gasohol						
A-A-52530 Limited Grade Regular Grade Midrange Grade Premium Grade	--- --- --- ---	--- --- --- ---	Bulk Bulk Bulk Bulk	01-090-1092 01-090-1093 01-355-2393 01-090-1094		
<u>Comments:</u> ASTM D 4814 (gasoline) allows the use of oxygenates to enhance antiknock quality and for the reduction of vehicle emissions. The use of gasoline fuels containing oxygenates designated as <i>reformulated</i> gasoline is mandated within parts of the U.S. by the Clean Air Act Amendments (CAAA) of 1990. STANAG 2845 covers NATO Code F-57 (GASOLINE, LOW LEAD, 91 RON) and NATO Code F-67 (GASOLINE, UNLEADED, 95 RON) as alternate fuels to ASTM D4814 for OCONUS only. F-57 can only be used with designated vehicles not equipped with catalytic converters.						

DIESEL AND TURBINE FUELS						DESCRIPTION																																																																																																																		
A-A-52557 - Fuel Oil, Diesel ASTM D 975 - Standard Specification for Diesel Fuel Oils MIL-DTL-5624 - Turbine Fuel, Aviation, Grades JP-4, JP-5 MIL-DTL-83133* - Turbine Fuel, Aviation, Kerosene Type, NATO F-34 (JP-8) NATO F-35, and JP-8+100 ASTM D 1655 - Standard Specification for Aviation Turbine Fuels						AR 70-12 provides the policies and responsibilities for use of liquid hydrocarbon fuels and identifies the primary, alternate, and emergency fuels for use in Army materiel. Diesel and turbine fuels are identified in AR 70-12 and are intended for use in ground combat, tactical and administrative vehicles and equipment as indicated in vehicle/equipment manuals. A-A-52557 covers diesel fuels suitable for use in all compression-ignition (diesel) engines and ground turbine engines. ASTM D 975 covers commercial diesel fuels designated Low Sulfur No. 1-D and Low Sulfur No. 2-D. Off-road, non-taxed, fuels will contain a red dye; these fuels are <u>not</u> covered by A-A-52557 as, ordinarily, only on-road fuels are procured. DF-2,(F-54), is high-sulfur fuel for use outside the U.S., territories and possessions. MIL-DTL-83133 (JP-8), MIL-DTL-5624 (JP-5), and ASTM D 1655 (JET A-1) cover kerosene base turbine fuels suitable for use in all compression-ignition (diesel) and turbine engines, for OCONUS and CONUS use.																																																																																																																		
Specification	Military Symbol	NATO Code	Size Container	NSN	Application	Temperature Range Usage																																																																																																																		
A-A-52557	DL-1 DL-2 DF-2	--- --- F-54	Bulk Bulk	9140-00-000-0185 00-000-0184 00-286-5294	★ Ground Diesel and Turbine Engines	<div>FOR ENGINES AND OTHER FUEL CONSUMING EQUIPMENT</div> <table><thead><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th><-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th>< -46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr></thead><tbody><tr><td colspan="19">DL-1 (Winter grade diesel fuel)</td></tr><tr><td colspan="19">DL-2, DF-2 (Regular grade diesel fuel)</td></tr><tr><td colspan="19">JP-5, JP-8, JET A-1 (Turbine fuel, kerosene type)</td></tr></tbody></table> <p>Note: Temperature usage limits for diesel fuels are based on average or specification values of flash and cloud points. Cloud point is adjusted for different geographical/climatic areas.</p>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49	DL-1 (Winter grade diesel fuel)																			DL-2, DF-2 (Regular grade diesel fuel)																			JP-5, JP-8, JET A-1 (Turbine fuel, kerosene type)																		
EXPECTED TEMPERATURES																																																																																																																								
°F	<-50	-40	-30	-20	-10		0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																					
°C	< -46	-40	-34	-29	-23		-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																					
DL-1 (Winter grade diesel fuel)																																																																																																																								
DL-2, DF-2 (Regular grade diesel fuel)																																																																																																																								
JP-5, JP-8, JET A-1 (Turbine fuel, kerosene type)																																																																																																																								
ASTM D 975	LS-1 LS-2	--- ---	Bulk Bulk	9140-01-398-1130 01-398-0697																																																																																																																				
MIL-DTL-5624	JP-5	F-44	Bulk	9130-00-273-2379	★ Turbine and Diesel Engines																																																																																																																			
MIL-DTL-83133	JP-8	F-34	Bulk	01-031-5816																																																																																																																				
ASTM D 1655	JET A-1^ ^ See comments	F-35	Bulk	00-753-5026																																																																																																																				
<u>Comments:</u> Although A-A-52557 (diesel fuel) may be indicated as the primary fuel, MIL-DTL-83133 (JP-8) or MIL-DTL-5624 (JP-5) will be used as the primary fuel in those theaters where the Single Fuel on the Battlefield is implemented in accordance with DOD Directive 4140.25 and AR 70-12. JET A-1, even though equivalent to JP-8, does not contain the additives required under JP-8. The additives required in JP-8 enhance the lubricity properties of the fuel preventing fuel pump wear in rotary-type fuel distribution injection pumps due to low lubricity fuel. However, this is not true for Jet A-1 and its use could result in fuel pump wear problems unless the equipment has been retrofitted with arctic equipment. For this reason, JET A-1 is not recommended for use in ground diesel engine equipment unless the fuel is additized to meet the recommended concentration of the corrosion inhibitor/lubricity improver (CI/LI) additive in accordance with QPL-25017. *JP-8+100 is not approved for use in Army systems.																																																																																																																								

REFEREE FUELS						DESCRIPTION																																																																																																																																																				
MIL-DTL-5624 - Turbine Fuel, Aviation, Grades JP-4 and JP-5						In accordance with AR-70-12 referee fuels shall be used during research, development, testing, and evaluation of military and commercial equipment and material. Referee grades represent minimal or marginal quality levels which can be acquired under the parent specification while meeting all of the requirements. MIL-DTL-5624 (JP-4 and JP-5) is kerosene base turbine fuel used to test turbine engines. MIL-DTL-46162 is used to test diesel and ground turbine engines; Type I conforms to DF-2 under CID A-A-52557, Type II conforms to MIL-DTL-83133, JP-8 turbine fuel. MIL-F-53080 is used to test next generation diesel and ground turbine engines; Type I represents the highest volatility fuel, Type II represents the lowest volatility fuel.																																																																																																																																																				
MIL-DTL-46162 - Fuel, Oil, Diesel, Referee Grade																																																																																																																																																										
MIL-F-53080 - Fuel, Engine Design, Referee Grade, Type I and Type II																																																																																																																																																										
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9140-	Application	Temperature Range Usage																																																																																																																																																				
MIL-DTL-5624	JP-4, JP-5	N/A	--	--	★ Turbine and diesel engines	<div>FOR ENGINE TESTING SYSTEMS</div> <table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><td>°F</td><td><-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><td>°C</td><td><-46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td rowspan="5"></td><td colspan="18">MIL-DTL-46162 Type I</td></tr><tr><td colspan="18">JP-4, JP-5, and MIL-DTL-46162 Type II</td></tr><tr><td colspan="18">MIL-F-53080 Type I</td></tr><tr><td colspan="18">MIL-F-53080 Type II</td></tr><tr><td colspan="18"></td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		MIL-DTL-46162 Type I																		JP-4, JP-5, and MIL-DTL-46162 Type II																		MIL-F-53080 Type I																		MIL-F-53080 Type II																																			
EXPECTED TEMPERATURES																																																																																																																																																										
°F	<-50	-40	-30	-20	-10		0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																																																							
°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																																																								
	MIL-DTL-46162 Type I																																																																																																																																																									
	JP-4, JP-5, and MIL-DTL-46162 Type II																																																																																																																																																									
	MIL-F-53080 Type I																																																																																																																																																									
	MIL-F-53080 Type II																																																																																																																																																									
MIL-DTL-46162	Type I Type II	-- --	Bulk --	01-056-8320	★ Diesel and ground turbine engines																																																																																																																																																					
MIL-F-53080	Type I Type II	-- --	-- --	-- --	★ Next generation diesel and ground turbine engines																																																																																																																																																					
<u>Comments:</u> Except as noted above, these products are not generally available by NSN, but must be ordered directly from manufacturers/suppliers.																																																																																																																																																										

B20 BIODIESEL FUEL						DESCRIPTION																																																																																																																
A-A-59693 - Diesel Fuel, Biodiesel Blend B20						B20, a fuel blend composed of 20 volume percent biodiesel conforming to ASTM D 6751 and 80 volume percent diesel conforming to ASTM D 975 or A-A-52557, B20 has been designated as an alternative fuel by the Department of Energy and the Environmental Protection Agency. Biodiesel is defined in ASTM D 6751 as “a fuel composed of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100																																																																																																																
Specification	Military Symbol	NATO Code	Size Container	NSN 9140-	Application	Temperature Range Usage																																																																																																																
A-A-59693	---	---	Bulk	01-470-4520	★ Ground Diesel Engines	<div>FOR ENGINES AND OTHER FUEL CONSUMING EQUIPMENT</div> <table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><td><-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><th>°C</th><td><-46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td rowspan="3"></td><td colspan="18">B20</td></tr><tr><td colspan="18"></td></tr><tr><td colspan="18"></td></tr></table> <div>Note: Temperature usage limits for diesel fuels are based on cloud points using the minimum tenth percentile values as guidelines. Cloud point is adjusted for different geographical/climatic areas to accommodate the seasonal changes. The temperature usage limits of B20 would be based upon the same minimum tenth percentile values that are given in A-A-59693 or ASTM D 975.</div>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		B20																																																					
EXPECTED TEMPERATURES																																																																																																																						
°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																				
°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																				
	B20																																																																																																																					
<u>Comments:</u> Although A-A-59693 (B20) can be used in lieu of A-A-52557 (diesel fuel) in conventional diesel engines without any hardware changes necessary, it is not approved for use in combat/tactical equipment. The maximum period for storing B20 is 6 months (and the initial acid number must not exceed 0.2 mg KOH/g sample). There is only one grade of B20. The Energy Conservation Reauthorization Act (ECRA) of 1998, an amendment to the Energy Policy Act (EPACT) of 1992, permits Federal Agencies to use biodiesel to meet a portion of their alternative fueled vehicle (AFV) acquisition requirements. Section 312 (Biodiesel Fuel Use Credits) of ECRA permits Federal Agencies to meet up to 50% of their AFV acquisition requirements by using biodiesel fuel. Under the new provisions, each 450 gallons of pure biodiesel (B100) used in a vehicle weighing over 8500 pounds counts as one full AFV credit. Since biodiesel is typically used as B20, using 2250 gallons of B20 equates to one AFV credit under EPACT.																																																																																																																						

REFERENCE OILS						DESCRIPTION																																																																																																																																					
MIL-PRF-2104 - Lubricating Oil, Internal Combustion Engine, Tactical Service						Reference oils are required for the proof testing of ground engines and vehicle systems. The Reference oils are selected from the Qualified Products List (QPL) of MIL-PRF-2104 such as to be representative of those products being procured for Army and DOD use.																																																																																																																																					
Military Specification	Military Symbol	NATO Code	Size Container	QPL	Application	Temperature Range Usage																																																																																																																																					
MIL-PRF-2104	OE/HDO-10	N/A	--	MC-3834	★ Engines, transmissions & gearboxes ★ Testing, evaluation, & R&D	<div>FOR ENGINE, TRANSMISSION AND GEARBOX TESTING SYSTEMS</div> <table><thead><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th><-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th>< -46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr></thead><tbody><tr><td></td><td colspan="18">OE/HDO-10</td></tr><tr><td></td><td colspan="18">OE/HDO-30</td></tr><tr><td></td><td colspan="18">OE/HDO-40</td></tr><tr><td></td><td colspan="18">OE/HDO-15/40</td></tr></tbody></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		OE/HDO-10																			OE/HDO-30																			OE/HDO-40																			OE/HDO-15/40																	
	EXPECTED TEMPERATURES																																																																																																																																										
	°F	<-50	-40	-30			-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																																						
	°C	< -46	-40	-34			-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																																						
		OE/HDO-10																																																																																																																																									
	OE/HDO-30																																																																																																																																										
	OE/HDO-40																																																																																																																																										
	OE/HDO-15/40																																																																																																																																										
	OE/HDO-30	N/A	--	MC-3835																																																																																																																																							
	OE/HDO-40	N/A	--	MC-3836																																																																																																																																							
	OE/HDO-15/40	N/A	--	MC-3837																																																																																																																																							

Comments: These products are not generally available by NSN, but must be purchased directly from the manufacturer/supplier. Orders and all questions concerning your order and pricing should be directed to Mr. William Sheils at (248) 851-7349.

MIL-PRF-680, DEGREASING SOLVENTS						DESCRIPTION																																																																																																																																																				
MIL-PRF-680 - Degreasing Solvent						<p>MIL-PRF-680 is a petroleum distillate degreasing solvent used for degreasing of machine parts in equipment maintenance. It is also known as "mineral spirits" or as "petroleum spirits." There are four types.</p> <p>Type I is an odorless Stoddard Solvent. It is intended to be used as a relatively safe dry cleaning solvent. When used indoors, adequate ventilation must be available to avoid excessive accumulation of vapors.</p> <p>Type II is an odorless high flash point (140°F) solvent. It should be used where a higher flash point solvent is required. When used indoors, adequate ventilation must be available to avoid excessive accumulation of vapors.</p> <p>Type III is an odorless 200°F flash point solvent. It is intended for used where a very high flash point is required and where conditions require that an odorless product is needed. It has a slower evaporation rate than Types I and II, and IV.</p> <p>Type IV is a citrus based hydrocarbon solvent. The performance of this solvent is very similar to Type II solvent.</p>																																																																																																																																																				
Military Specification	Military Symbol	NATO Code	Size Container	NSN 6850-	Application	Ambient Temperature Range Usage																																																																																																																																																				
MIL-PRF-680 Type I	SD-1	S-752	1 Gallon 5 Gallon 55 Gallon	01-474-2302 01-474-2309 01-474-2313	★ Degreasing & for metal parts where flammability is not an issue.	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th><-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th>< -46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr><tr><td rowspan="5"></td><td colspan="18">SD-1 (S-752)</td></tr><tr><td colspan="18">SD-2 (S-753)</td></tr><tr><td colspan="18">SD-3 (S-760)</td></tr><tr><td colspan="18">SD-4</td></tr><tr><td colspan="18"></td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		SD-1 (S-752)																		SD-2 (S-753)																		SD-3 (S-760)																		SD-4																																			
EXPECTED TEMPERATURES																																																																																																																																																										
°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																																																								
°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																																																																								
	SD-1 (S-752)																																																																																																																																																									
	SD-2 (S-753)																																																																																																																																																									
	SD-3 (S-760)																																																																																																																																																									
	SD-4																																																																																																																																																									
MIL-PRF-680 Type II	SD-2	S-753	1 Gallon 5 Gallon 55 Gallon	01-474-2319 01-474-2317 01-474-2316	★ General degreasing for metal parts.																																																																																																																																																					
MIL-PRF-680 Type III	SD-3	S-760	1 Gallon 55 Gallon	01-474-2318 01-474-2320 01-474-2321	★ Degreasing for metal parts in confined areas or where high flash point is required.																																																																																																																																																					
MIL-PRF-680 Type IV	SD-4		Pint 1 Gal 5 Gal 55 Gal DR	01-472-2723 01-472-2722 01-472-2717 01-472-2719	* General degreasing solvent for metal parts.																																																																																																																																																					
<u>Comments:</u> MIL-PRF-680 is an environmentally complaint solvent and low toxic solvent. However Type I is a flammable solvent due to its low flash point. All should be disposed of as a regulated hazardous waste or can be recycled.																																																																																																																																																										

CLEANING COMPOUND						DESCRIPTION																																																																																															
MIL-PRF-372 - Cleaning Compound, Solvent (For BORE of Small Arms and Automatic Aircraft Weapons)						MIL-PRF-372 is a highly penetrating, mobile liquid intended for use in cleaning the bores of small arms and automatic aircraft weapons. The material provides a temporary rust-resistant coating for the cleaned surface.																																																																																															
Military Specification	Military Symbol	NATO Code	Size Container	NSN 6850-	Application	Ambient Temperature Range Usage																																																																																															
MIL-PRF-372	RBC	--	2-Oz. 8-Oz. 1-Quart 1-Gal	00-224-6656 00-224-6657 00-224-6658 00-224-6663	★ Cleaning compound and temporary preservative	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><td>°F</td><td><-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><td>°C</td><td><-46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td></td><td colspan="18">RBC</td></tr><tr><td></td><td colspan="18"></td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49		RBC																																				
EXPECTED TEMPERATURES																																																																																																					
°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																			
°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																																																																			
	RBC																																																																																																				
<u>Comments:</u> MIL-PRF-372 provides temporary preservation of metal and removes primer salts.																																																																																																					

